Fact Sheet

Tapping into Stranded Domestic Oil: Enhanced Oil Recovery with Carbon Dioxide Is a Win-Win-Win

Americans are demanding measures that will relieve the pain they are feeling at the pump today. The country has a significant, untapped win-win-win opportunity to stimulate our economy and reduce our dependence on imported oil while actually helping to protect wild places and reduce global warming pollution: a process known as carbon dioxide enhanced oil recovery (CO_2-EOR). According to industry research CO_2-EOR would give America access to large, domestic oil resources—potentially more than four times the proven U.S. reserves, or up to 10 full years of our total national consumption. But without the stimulus of climate protection legislation, CO_2 for oil recovery is likely to remain in short supply and most of this domestic oil resource will stay in the ground.

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CO_2-EOR Can Produce More Oil Right Now

Enhanced oil recovery using carbon dioxide offers an immediate- to medium-term opportunity to produce more oil right here at home, from mature fields that have already been drilled and have much of the needed infrastructure already in place. CO_2 injection can increase oil production in as little as a few months to two years—a fraction of the time needed to discover, further explore, and develop a viable new oil field. And in the EOR process, large quantities of CO_2 from industrial sources can be sequestered underground rather than emitted to the atmosphere, reducing global warming pollution.

"Stranded oil" is oil that is left in the reservoir after conventional recovery techniques have been completed. Injecting CO_2 mobilizes the stranded oil, driving it to the wellbore and making it recoverable. This CO_2 "flooding" used for enhanced oil recovery can result in a recovery of up to 20 percent more of the original oil in place. Nationally, a massive 400 billion barrels of oil remains stranded, of which 85 billion barrels could be technically recoverable according to oil and gas industry research and consulting firm Advanced Resources International.[1] As much as 45 billion barrels of "stranded oil" from just over 1,000 existing fields would be economical to produce at a price equal to $70 per barrel.

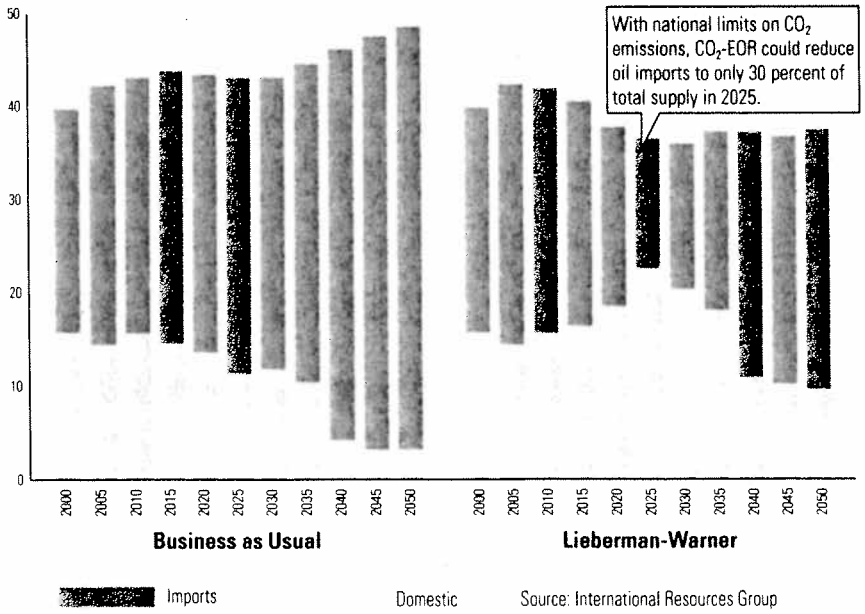
Facts

Tapping into Stranded Domestic Oil: Enhanced Oil Recovery with Carbon Dioxide and Win-Win

Policies for CO_2 Will Accelerate Enhanced Oil Recovery

Growth of CO_2-EOR as a technique for extracting oil has been limited because, until recently, oil prices have been relatively low. Moreover, there is limited availability of high-volume sources of the CO_2 that is needed for EOR operations. The short supply is now placing a premium on the cost of CO_2 to operate the floods, which can add up to half the total costs of a CO_2-EOR project. In the absence of policies or national limits on CO_2 emissions, the cost of capturing anthropogenic CO_2 and the limited supply of CO_2 from natural underground "domes" have kept new projects in check. Rising oil prices however, have now made CO_2-EOR economics look far more attractive. With CO_2 supply for new EOR projects more constrained than ever, EOR operators are exploring ways to expand their operations by using anthropogenic CO_2 to supplement natural sources.

Domestic vs. Imported Oil Consumption (Quads)



Source: International Resources Group

Enhanced Oil Recovery

The use of CO_2 for commercial EOR began in the United States in the early 1970s. There are currently about 120 registered CO_2 floods worldwide, almost 85 percent of which are in the United States and Canada. Some 44 million tons of newly purchased CO_2 annually are injected in mature oil reservoirs. To date, no significant documented environmental impacts from CO_2 injection, such as to groundwater sources, have been reported. The impacts of CO_2-EOR should be evaluated on a site-by-site basis to ensure that the location is appropriate, taking into account infrastructure or transportation impacts and subsurface conditions. Additional steps, such as careful field characterization combined with appropriate monitoring, operational, and reporting procedures, can ensure permanent sequestration of the CO_2 in the oil fields. As with any other oil-extraction process, responsible operations are essential and sound regulations can help minimize any surface or subsurface risks.

Limiting CO_2 emissions would increase the supply and lower the cost of CO_2 available for EOR, making it possible to tap a much larger share of the untapped oil resource in existing fields. The results of a recent study by the International Resources Group (IRG) analyzing how climate legislation could increase supplies of CO_2 for EOR demonstrate the power of CO_2-EOR combined with fuel efficiency: by 2025, oil imports could drop from 70 to 35 percent of total oil supply, due to both lower demand and greatly expanded domestic production from existing fields using CO_2 captured from power plants and other sources.[2] The study projects that the Lieberman-Warner Climate Security Act would accelerate deployment of power plants using carbon capture systems and advanced vehicles and cellulose-based biofuels.

The IRG analysis shows that oil imports rise again between 2035 and 2050 as the "first tier" EOR resource begins to be depleted, although the anticipated large supplies of captured CO_2, and advanced CO_2-EOR techniques, some of which are now in early deployment stages, could extend the peak of EOR production well beyond 2025 and toward the "technical" potential of 85 billion barrels (see figure).

CO_2-EOR has a substantial immediate- to long-term role to play in both increasing domestic oil production in a responsible way, and in sequestering CO_2 underground. Policies that incentivize the capture of industrial CO_2 can help the country access an untapped domestic oil resource while reducing global warming pollution.

1 "Storing CO_2 with Enhanced Oil Recovery", DOE/NETL-402/1312/02-07-08, February 2008. U.S. basins were surveyed, screening existing oil fields for CO_2-EOR potential in AK, CA, AL, FL, MS, LA, OK, AR, KS, NE, IL, MI, TX, NM, CO, UT, WY, MT, ND, SD, WV, OH, KY, and PA.

2 Study by International Resources Group using an improved and extended version of the MARKAL model (US-NM50). The reference point for the analysis is a business-as-usual (BAU) scenario calibrated to the Department of Energy's 2008 Annual Energy Outlook. Pat DeLaquil, Gary Goldstein and Evelyn Wright, *U.S. Technology Choices, Costs and Opportunities under the Lieberman-Warner Climate Security Act: Assessing Compliance Pathways*, International Resources Group, 2008. See http://docs.nrdc.org/globalwarming/glo_08051401A.pdf and http://www.nrdc.org/legislation/factsheets/leg_08051401A.pdf.